

Wheeler Diagrams: A Useful Exploration Tool in the Gulf of Mexico

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ABSTRACT

One product that resulted from our study of the sequence stratigraphy of the Corpus Christi Bay region was a time stratigraphic cross section, commonly known as a “Wheeler diagram.” The cross section portrays time on the y-axis (ordinate) and distance on the x-axis (abscissa). The Corpus Christi Bay area comprises a series of growth-faulted subbasins that become younger basinward. From our research, we were able to delineate the third-order (~1-3 Ma) sequences of the Frio Formation and determined that each subbasin, in large part, comprises the off-shelf portion (*i.e.*, basin floor fan, slope fan complex and prograding wedge) of a third-order lowstand systems tract. Using available, in some cases sparse, biostratigraphic data, we were able to calibrate and correlate the sequence boundaries and maximum flooding surfaces of the local third-order sequences to global coastal onlap and global cycle charts. In a subsequent study of time equivalent sections in another part of the Gulf of Mexico Basin, we used the Frio time cross section to predict the ages of prospective Oligocene off-shelf lowstands, which had minimal paleontologic control. Using the time cross section and published fault maps in conjunction with the hypothesis that significant growth faults approximate paleo shelf edges, it was possible to estimate the location, stratigraphy, and age of intraslope subbasins containing highly prospective off-shelf lowstand deposits basinward from areas of better well and biostratigraphic control. We propose that so-called “Wheeler diagrams” in conjunction with sequence stratigraphy can be useful, predictive, exploration tools.